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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,311	06/20/2001	Bryan Patrick Livengood	LE9-99-015	4577

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EXAMINER
RODEE, CHRISTOPHER D

ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/885,311	LIVENGOOD ET AL.	
	Examiner	Art Unit	
	Christopher D RoDee	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-22 and 30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-22 and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 January 2003 has been entered.

Claim Rejections - 35 USC § 112

Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear in claim 30 if the limitation "to a level that is about 1.5 weight percent" means that the composition has the random copolymer compatibilizer added to that level (as in "at" that level) or if this is a claim to a range (as in "up to" that level). The Examiner suggests that the claim be amended to change "to a" to "at".

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3-9, 11, 12, 14, 21, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin in US Patent 5,955,235.

Lin discloses a toner having a binder resin, a wax, and a poly(alpha-olefinalkylene dicarboxyl imide) compatibilizer. The compatibilizer appears to be a random copolymer as specified in column 8, line 13 – column 9, line 48, because each olefinalkylene unit alternates with a dicarboxyl imideunit. This gives a pure alternating copolymer as discussed in the instant specification (p. 14, l. 22-24). The compatibilizer improves dispersion of the wax in the toner binder resin (col. 5, l. 41-59). Useful waxes include polyolefins (col. 10, l. 25). It appears that the units of the compatibilizer are respectively compatible with units of the binder resin and the wax as domains of the wax are present in the binder resin (Example 1; col. 16). The Examples each use a polyester binder resin while the disclosure at column 7, lines 52 *et seq.* specifically contemplates a styrene-butadiene binder resin (the butadiene appears to meet the requirements of an olefin) with the wax, compatibilizer, and other components. The reference also specifically discloses styrene-acrylate and styrene methacrylate copolymers as the binder resin (patent claim 8). Polypropylene waxes are exemplified in the reference (col. 6, l. 63-67 & Examples).

Claims 1, 3-10, 12, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Crystal in US Patent 4,027,048.

Crystal discloses a toner containing two incompatible polymers. One polymer is a "tough" polymer that serves as a matrix. The other polymer is a soft polymer that is present as a plurality of discrete domains inside the matrix (col. 2, l. 15-42). This soft polymer provides desired fixing properties. The domain size of the matrix is preferably about 0.1 to about 2 microns (col. 4, l. 4-19). A compatibilizer (i.e., dispersing agent) is combined with the matrix polymer and domain polymer to improve dispersion of the domain in the matrix (col. 4, l. 34-63). One component of the compatibilizer is compatible with the matrix polymer and another component is compatible with the domain polymer, thus forming a copolymer (col. 4, l. 55-63)

having one unit of the "tough" and one unit of the "soft" polymer. The reference specifically discloses a "shaded" copolymer as effective as a compatibilizer. This shaded copolymer is defines as being a random copolymer (col. 4, l. 48-55) and is used in an amount of from about 1 to about 50 weight % (col. 5, l. 3-6). The amount of the compatibilizer affects the domain size (col. 4, l. 64-68). The Examples present compatibilizers with specific ratios of monomers pertinent to the instant claims.

Preferred matrix polymers include polystyrene, styrene copolymers, polymers of alkylmethacrylates, vinyl chloride polymers, polyamides, and polymers of acrylic or methacrylic acid (col. 3, l. 20-33). The glass transition temperature of the matrix polymer is greater than 50 °C, preferably about 55 °C to about 180 °C. The number-average molecular weight of the matrix polymer is preferably 5000 to about 300,000 (col. 2, l. 43-55). Preferred soft polymers include polyolefin waxes (col. 3, l. 68), which would be understood by the artisan to release agents. The glass transition temperature of the domain polymer is less than about 30 °C, preferably about -50 °C to about 10 °C. The number-average molecular weight of the matrix polymer is preferably 500 to about 50,000 (col. 3, l. 34-44).

The toner can be combined with a carrier to form a developer (col. 6, l. 61-65).

Applicants traverse this rejection as it may be pertinent to the instant claims because the reference discloses a "shaded" random copolymer. Applicants state that a shaded copolymer "is simply not random regardless of mention of random in its description" (response p. 3). Applicants note that that the reference states there is a higher concentration of one component at one end of the copolymer and a higher concentration of the other component at the other end of the copolymer. Such a structure is not included within the scope of the claims.

The Examiner has carefully considered these remarks in light of the amendments to the claims and the specification disclosure. The claims resemble those at the time of the first Office

action except that claim 1 includes the limitations of claim 2, which was also rejected by this reference, and that the secondary resin consists of the random copolymer. The dispersing agent in Crystal is the only component disclosed that corresponds to the claimed secondary resin. It thus appears that the reference meets the more restrictive "consisting of" limitation.

With respect to the "random" nature of the instant secondary resin and the dispersing agent of the reference, the Examiner notes that the instant specification discusses random copolymers as follows.

> "[B]lock copolymers are one end of a spectrum of copolymers that ranges from alternating to block copolymers. This is to say that for a copolymer made from A and B monomers, one end of the spectrum is a polymer comprised of strictly alternating A-B-A-B units (an "alternating copolymer"), while the other end is a polymer having one end A-A-A in a single block with the other end B-B-B in a single block (a 'block copolymer'). Random copolymers lie within these two extremes." (spec. p. 12).

The specification clearly identifies a block copolymer as different from a random copolymer. The specification also shows that the random copolymer lies between the extremes of a block copolymer and an alternating copolymer.

The Crystal reference, likewise, defines a block copolymer as different from a shaded random copolymer. In column 4, lines 33+ Crystal states that dispersing agent may take the form of a block copolymer, a graft copolymer, or a shaded random copolymer. Note that the block copolymer and shaded random copolymer are alternatives. Clearly the shaded random copolymer is different from a block copolymer in Crystal. Considered the reference in terms of the specification disclosure it is reasonable to consider the reference's shaded copolymer to be between a block copolymer and an alternating copolymer. The specification does not state exactly where the random copolymer is between the block copolymer and the alternating

copolymer. The specification does not state whether a random copolymer encompasses the entire area between a block and alternating copolymer or some smaller area between the extremes. The skilled artisan given the guidance provided in the specification and the artisan's knowledge makes the determination of what constitutes a random copolymer.

The artisan would considered Crystal's shaded random copolymer a random copolymer within the scope of the claims. The reference and the specification are consistent in their identification of block copolymers and random copolymers as different. The shaded random copolymer of Crystal falls within the "extremes" of a random copolymer as discussed in the specification.

Crystal also states that the dispersing agent is a random copolymer. The language of the reference cannot be discounted. Crystal shows that one of ordinary skill considers a shaded polymer as a random copolymer, not a block copolymer and not a graft copolymer. There is some "randomness" in the manner in which the copolymer units assemble during the polymerization process. The instant claims, in light of the specification, do not prescribe any specific degree of randomness or copolymer unit arrangement.

Crystal's shaded copolymer is a random copolymer -- the reference states this. The instant specification and claims do not define the term "random" in a manner which defines over the structure of Crystal.

The reference is applicable prior art and the rejection is reapplied.

Claim Rejections - 35 USC § 103

Claims 1, 3-10, 12-18, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crystal in US Patent 4,027,048 in view of Katada *et al.* in US Patent 5,972,553 and further in view of Sato *et al.* in US Patent 5,985,501.

Crystal was discussed above. In the event the disclosure is not specific enough to identically disclose the claimed toner composition in claims 1 3, 4-10, 12, and 22, this rejection is applied. Additionally, the reference does not identically disclose the claimed compatibilizer (dispersing agent) content or structural components of the compatibilizer (i.e., second resin), primary resin, and wax as specified in the instant dependent claims.

Katada discloses that waxes, such as polyolefins, are well known release agents. These components provide anti-offset character and low temperature fixing ability (col. 4, l. 35-38). Sato discloses release agents as low molecular weight polyolefins such as polyethylene and polypropylene (col. 7, l. 53-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use those use a polyolefin wax as the domain polymer in Crystal because this is a specifically disclosed domain polymer. It would also have been obvious to use the shaded (random) copolymer as the dispersing agent (i.e., compatibilizer) in Crystal because this is one of three structures disclosed for the dispersing agent. It would have been obvious optimize the amount of the dispersing agent to achieve nearly the same size of domains in the toners because Crystal teaches control of domain size via choice of dispersing agent amount. The artisan would expect similar size of domains in each toner particle because the amount of dispersion agent is constant throughout the composition.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use polyethylene or polypropylene as the polyolefin wax in Crystal because polyethylene and polypropylene are disclosed in Sato as known release agents and Katada discloses identifies polyolefins as effective waxes to provide low temperature fixing properties. The artisan would have been expected to use well known polyolefins for the low fixing temperature characteristics desired in Crystal for the soft polymer.

Given the disclosure of the specific matrix polymer constituents in Crystal (e.g., methacrylate, methacrylic acid) and the disclosure of useful polyolefin waxes in the supporting references, such as polyethylene, would have motivated the artisan to produce the dispersing agent from monomer units corresponding to each of the matrix polymer and polyolefin waxes.

This rejection is maintained for the same reasons as discussed above for the § 102 rejection over Crystal. The reference discloses a random copolymer as required by the instant claims. The specific combination and reasons for holding of obviousness have not been traversed for any other reasons. The rejection is, therefore, maintained.

Claims 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crystal in US Patent 4,027,048 in view of Katada *et al.* in US Patent 5,972,553 and further in view of Sato *et al.* in US Patent 5,985,501 as applied to claims 1, 3-10, 12-18, and 20-22 above, and further in view of Mahabadi *et al.* in US Patent 5,364,724.

Crystal, Katada, and Sato were described above. The references do not disclose olefin as a monomer for the matrix polymer, but Mahabadi discloses that typical vinyl monomers for a toner resin include unsaturated mono-olefins (col. 5, l. 49-51). The disclosure of polymers for the toner resin in Mahabadi overlaps substantially with the polymers disclosed in Crystal (see Mahabadi: col. 5, l. 36-68). These binder resins are used in toners where compatibility with a wax (e.g., polyethylene and polypropylene) is desired (col. 5, l. 6-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an unsaturated mono-olefin as one of the monomers for the matrix polymer in Crystal because Mahabadi discloses olefins as particularly effective and both references are concerned with using compatibilizers for waxes and binder resins. There is

sufficient similarity between the disclosures of the references to indicate that the artisan would have a likelihood of success in making the proposed combination.

This rejection is maintained for the same reasons as discussed above for the § 102 rejection over Crystal. The reference discloses a random copolymer as required by the instant claims. The specific combination and reasons for holding of obviousness have not been traversed for any other reasons. The rejection is, therefore, maintained.

Allowable Subject Matter

Claim 30 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher D RoDee whose telephone number is 703 308-2465. The examiner can normally be reached on most weekdays from 6 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703 308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

cdr
January 27, 2003

CHRISTOPHER RODEE
PRIMARY EXAMINER